Channel A

Channel B

OF = 1.0

(a)

Channel A

Channel B

OF = 0.85

(b)

Channel A

Channel B

OF = 0.55

(c)

Fig. 2

```
┌─────────────────────────────────────────────┐
│ Base station recieves multiple signal        │
│ components from a number of terminals         │
│ For each terminal:                            │
└─────────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────┐
│ Determine a number of the strongest signal   │
│ components displaced in time                  │
└─────────────────────────────────────────────┘
            │                       │
            ▼                       ▼
┌──────────────────────┐   ┌──────────────────────────┐
│ Continuous or slow    │   │ Fast fade strongest       │
│ fade strongest        │   │ component determination   │
│ component             │   │ algorithm - see fig 5.    │
│ determination         │   └──────────────────────────┘
│ algorithm - see fig 4 │               │
└──────────────────────┘               │
            │                           │
            ▼                           ▼
┌─────────────────────────────────────────────┐
│ Determine difference in time between          │
│ strongest component and a reference time      │
└─────────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────┐
│ If timing difference exists, instruct terminal│
│ to adjust its transmission timing             │
└─────────────────────────────────────────────┘
```

Fig 3

Fig 4.

average signal strength of each of
the strongest signal components
over a predetermined interval

↓

Determine whether ~~the~~ any of the
average signal strengths of the currently
~~the average signal~~ synchronised
signal component is exceeded
by any of the other components

If so, does the highest average signal
strength exceed that of the currently
synchronised component by a predet. threshold

↓

If so, if is the offset is true than these
components more than a predetermined
threshold.

↓

If so, assign the highest ave. signal strength component
as the new strongest component.

Fig 5.

Determine average signal strength of the strongest signal components over a shuttered predetermined period

Determine whether the average of the current strongest component is below the combined average of the other components by a predetermined amount

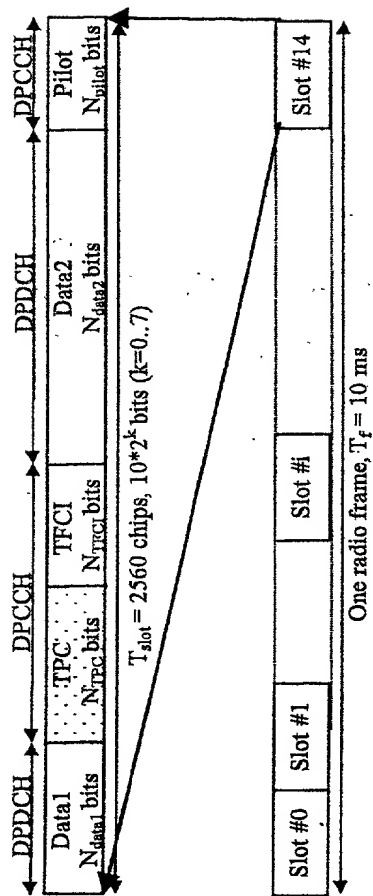If so, assign the highest average signal component as the strongest component.

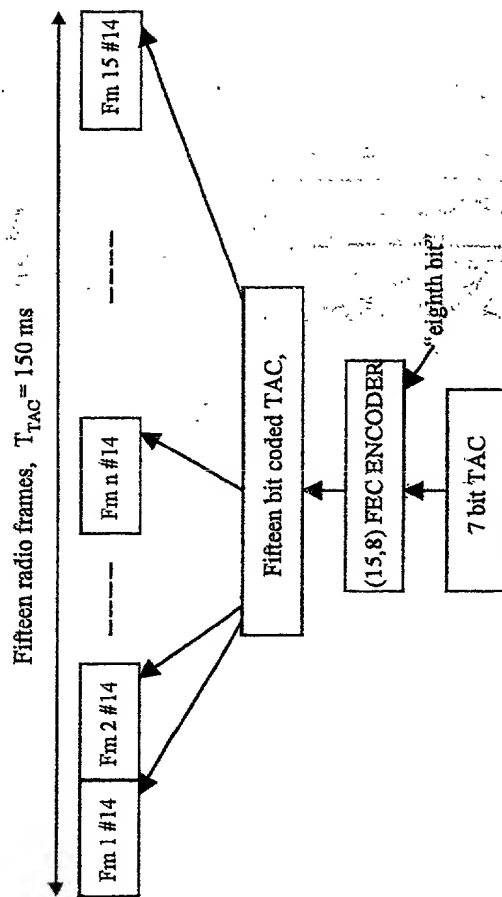DPDCH | DPCCH | DPCCH | DPDCH | DPCCH

| Data1 N_{data1} bits | TPC N_{TPC} bits | TFCI N_{TFCI} bits | Data2 N_{data2} bits | Pilot N_{pilot} bits |

T_{slot} = 2560 chips, $10*2^k$ bits (k=0..7)

| Slot #0 | Slot #1 | Slot #i | Slot #14 |

One radio frame, T_f = 10 ms

Figure
6a

Fifteen radio frames, $T_{TAC} = 150$ ms

| Fm 1 #14 | Fm 2 #14 | ----- | Fm n #14 | ----- | Fm 15 #14 |

Fifteen bit coded TAC,

(15,8) FEC ENCODER — "eighth bit"

7 bit TAC

Figure
6b

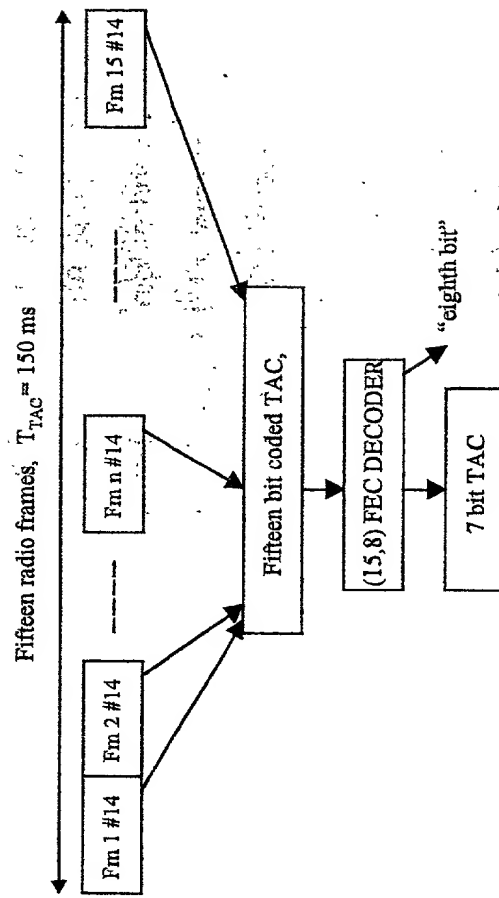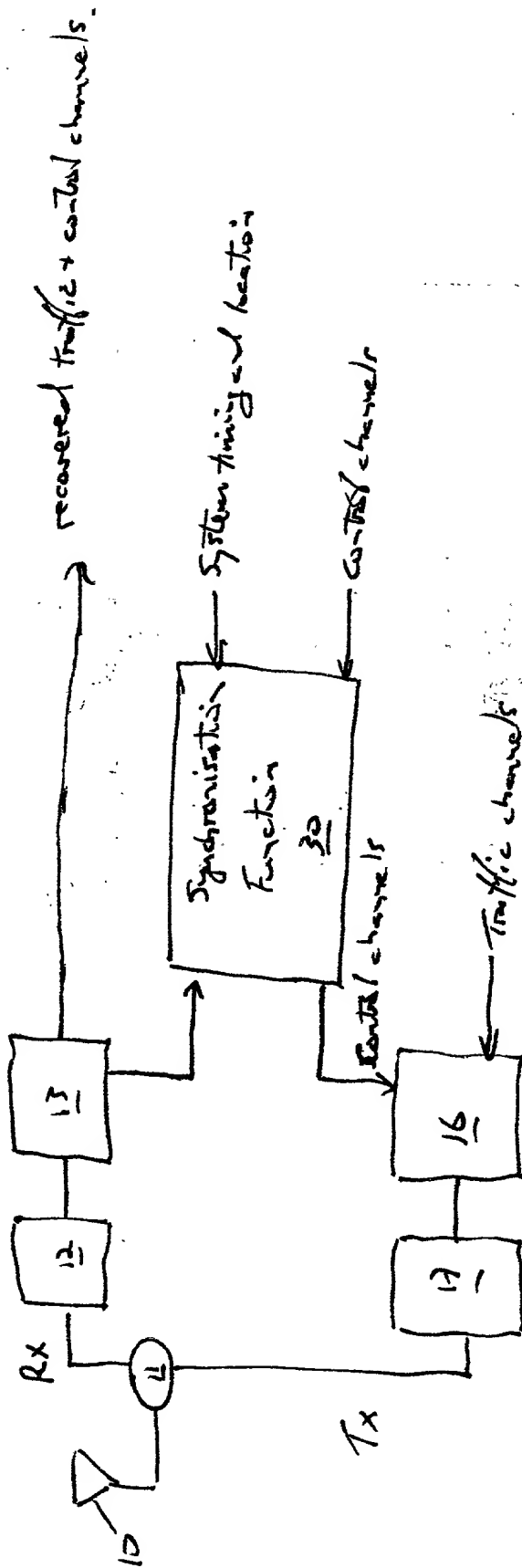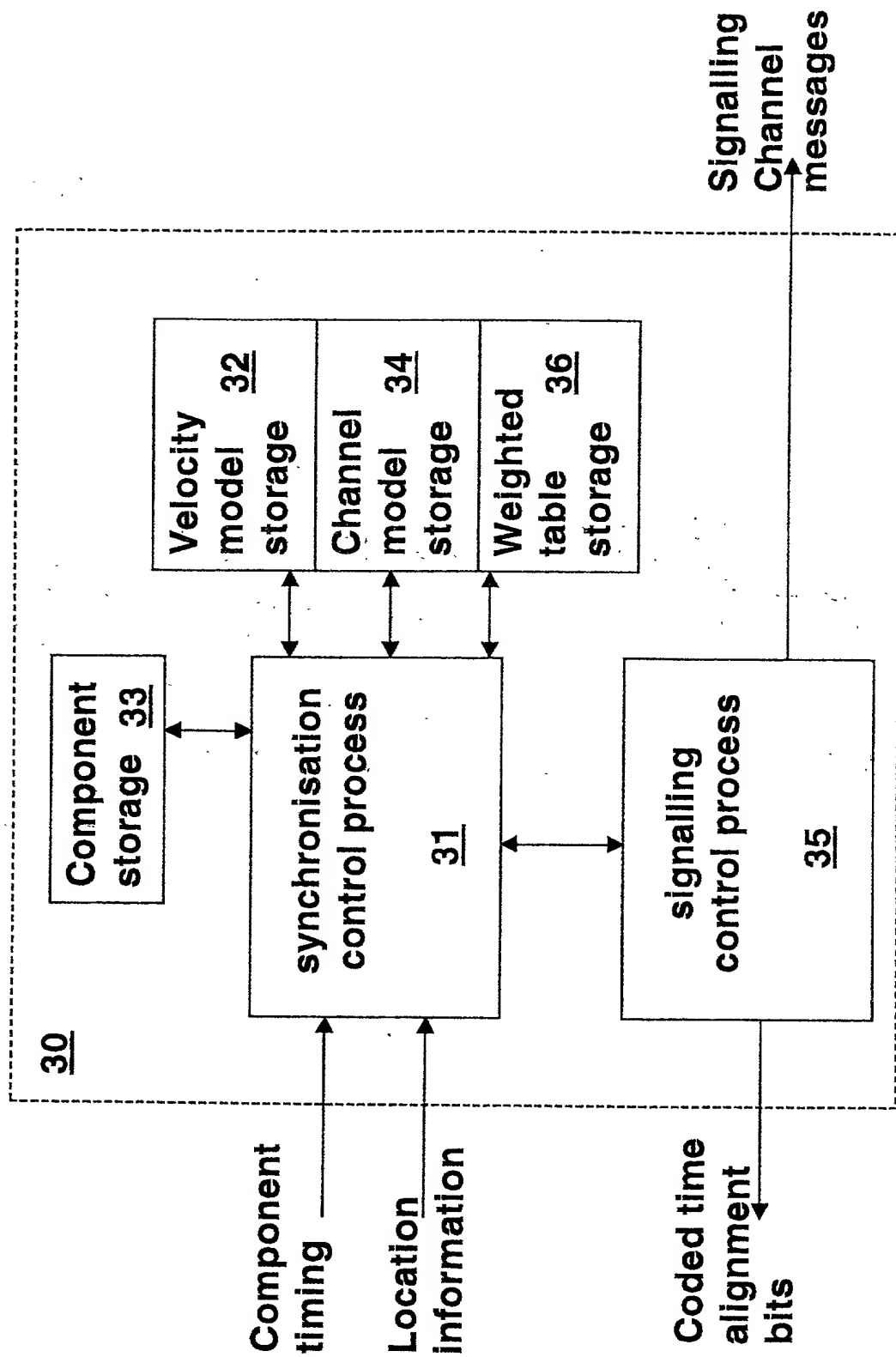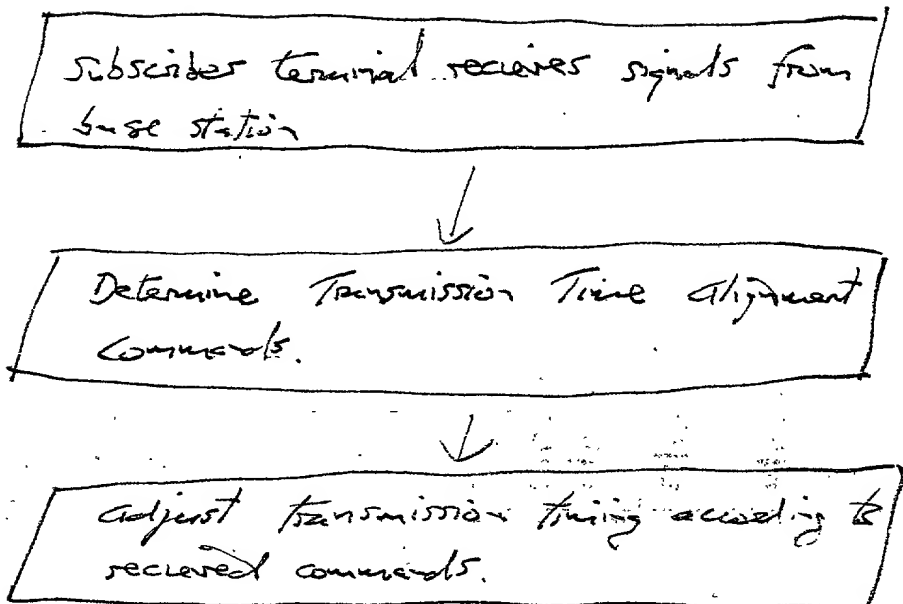| 7 bit TAC	function
0000000	do nothing
0000001	if this is the only weighted bit set -
	advance time by table entry 0 (default 1/8 chip , tracking mode)
	if this is set in combination with other weighted bits -
	advance time by table entry 1 (default 1/4 microsecond)
0000010	advance time by table entry 2 (default 1/2 microsecond)
0000100	advance time by table entry 3 (default 1 microsecond)
0001000	advance time by table entry 4 (default 2 microseconds)
0010000	advance time by table entry 5 (default 4 microseconds)
0100000	advance time by table entry 6 (default 8 microseconds)
1000000	do nothing
1000001	if this is the only weighted bit set -
	retard time by table entry 0 (default 1/8 chip , tracking mode)
	if this is set in combination with other weighted bits -
	retard time by table entry 1 (default 1/4 microsecond)
1000010	retard time by table entry 2 (default 1/2 microsecond)
1000100	retard time by table entry 3 (default 1 microsecond)
1001000	retard time by table entry 4 (default 2 microseconds)
1010000	retard time by table entry 5 (default 4 microseconds)
1100000	retard time by table entry 6 (default 8 microseconds)

Figure
6c

Figure
6d

recovered traffic + control channels.

System timing and location

control channels

Synchronisation Function 30

Control channels

Traffic channels

Rx

13

12

10

16

17

Tx

Fig 7

Figure 8

Fig 5.

```
┌─────────────────────────────────────────────┐
│  Subscriber terminal receives signals from   │
│  base station                                │
└─────────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────┐
│  Determine Transmission Time Alignment       │
│  Commands.                                   │
└─────────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────┐
│  Adjust transmission timing according to     │
│  received commands.                          │
└─────────────────────────────────────────────┘
```

Traffic and control channels to other parts of the mobile unit

Traffic and control channels from other parts of the mobile unit

Table of weights 44

Timing alignment control function 40

DPCCH

System clock 42

26

Local oscillator 41

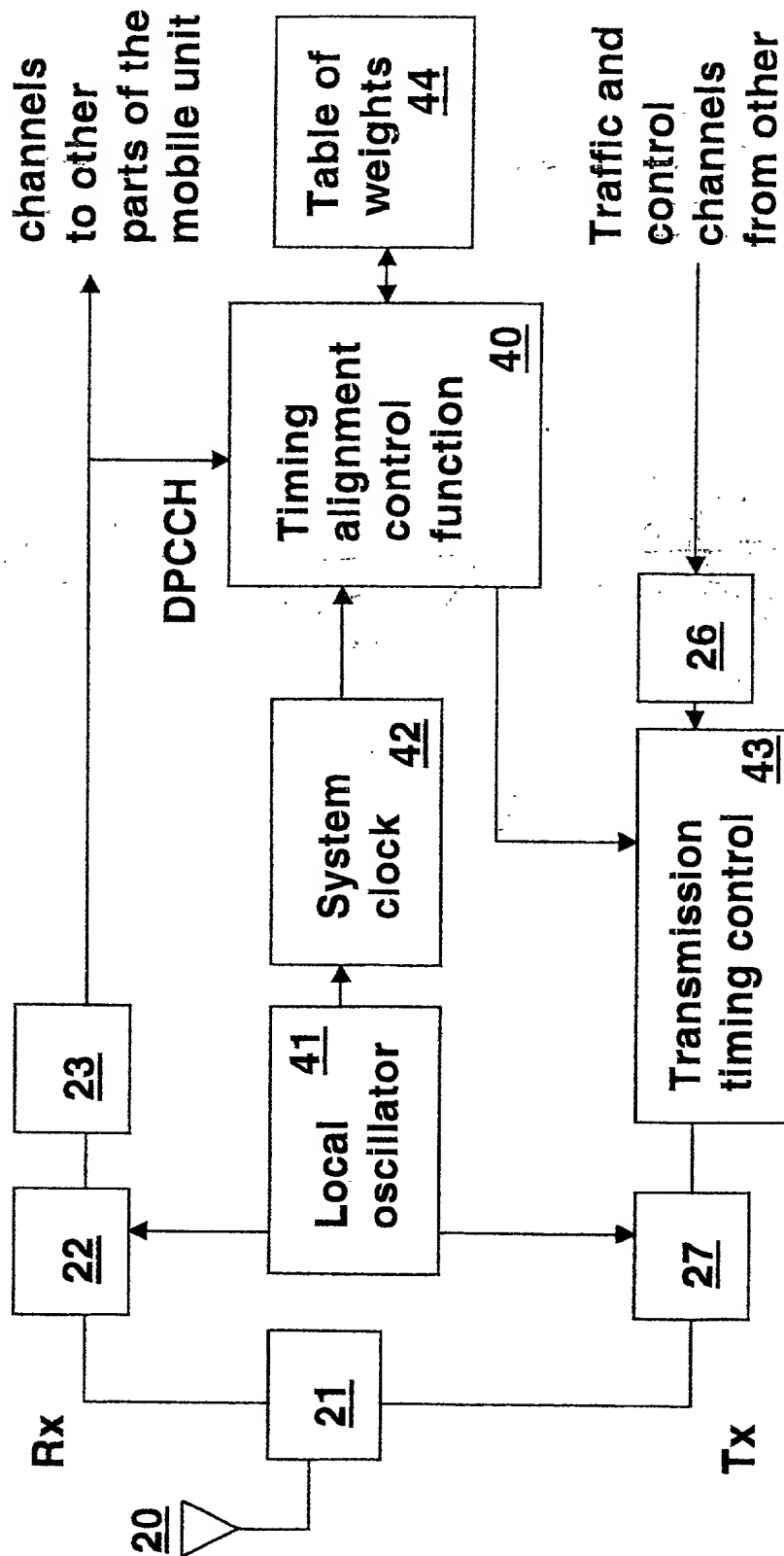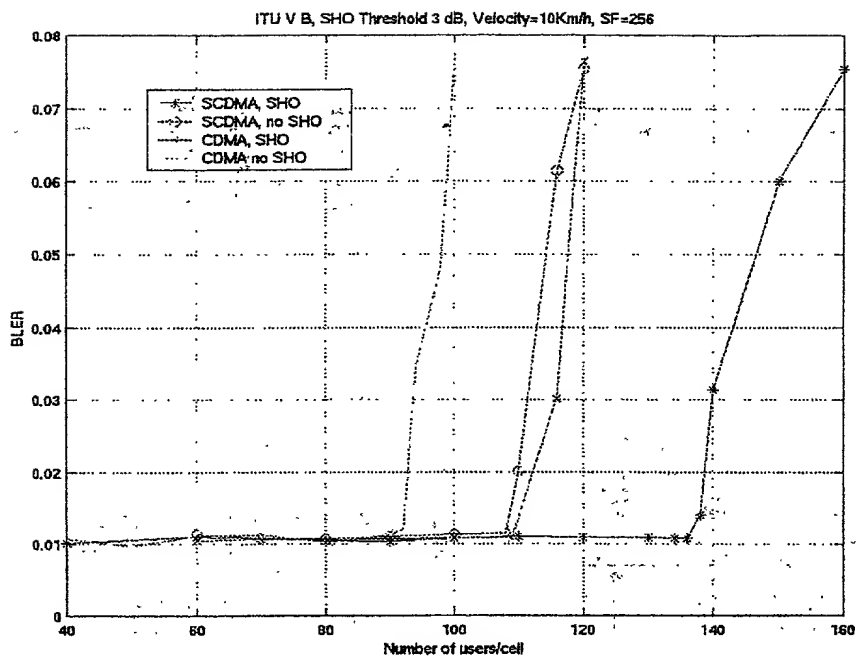Transmission timing control 43

Rx

23

22

27

21

20

Tx

Figure 10

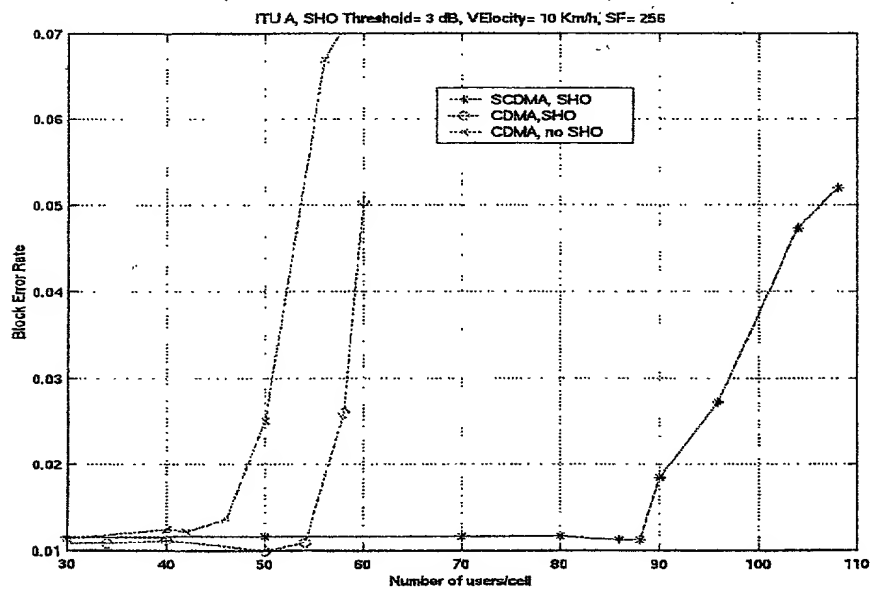Figure 11a: Channel model: ITU Vehicular Channel B, Velocity 10 Km/h, SHO threshold: 3dB

Figure 11b: Channel model: ITU Outdoor-Indoor Ch A, Velocity 10 Km/h